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Water Reuse in Japan

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Precipitation and Water Resource in the World

- Average annual precipitation is nearly 1,700mm
 - = about double the world average of 800mm
- A large population in a small area
 - ightarrow precipitation per capita is about 1/3 the world average



Water Reuse History in Japan

- Severe **drought** in west Japan
- Large reuse start
- 1st GL 1981 Toilet flushing, Spraying, Landscape use
- 2nd GL 1990 +Recreational use
- **Cryptospordium** outbreak 1996
- Drinking Water Std. -> E.Coli 2003
- 3rd GL E. Coli, Turbidity <2

50M m^3/y Water Trucks

1978

1980

2005

2014

Double piping in Fukuoka buildings

RO water recreational use in Tokyo

+ Heat recycle **Reuse amount 215** M m³ / y

Reclaimed Wastewater Use in Japan

Reclaimed Wastewater Use in Tokyo

River flow augmentation

MEGURO River, etc. 68,000m³/day

Toilet flushing

West-Shinjuku, Nakano Sakaue areas, etc. 9,300m³/day

Recreational Use

Cleaning

FY2010 Total 78,000 m³/day

YURIKAMOME train, 1,800m³/year

Ochiai Water Reclamation Center SESERAGI NO SATO, 16,000m³/year

Reclaimed Wastewater use in Fukuoka - Background of Heavy Draught

> Based on drought experiences, Japan has established wide ranges of wastewater reclamation applications. Fukuoka City **Fukuoka City Utilization of Reclaimed Water Drought in 1978** 1,165ha Service Area, Double Pipe System 5,500m3/day supply in Buildings ukuoka Yahoo! Japan Dome Water Truck in Operation Building of over a certain size are **Canal City Fukuoka** required of double pipe Service Area (Commercial Facility) system WWTP **Treatment System** Activated Sludge + **Chemical Precipitation Dried up Minamihata** + Ozonation + Sand Dam Filtration

Reclaimed Wastewater use at a Soccer Stadium

In Yokohama City, advanced treated water is used for toilet flushing in a football stadium and event sites. Yokohama City Sand Proclaimed -> filteration wastewater Ozone facility omitting Ozone **Event site** generator devise Park Soccer stadium (toilet flushing, air **Resource recycle** conditioning heat) agency Event site Center bldgs. in (toilet flushing) Shin-vokohama Park (scenery canal) Ozone Soccer stadium generator Park Ozone reactor (Nissan Stadium) (scenery canal) Use of reclaimed wastewater for toilet flushing Dist. pipe of Park - Major items of water quality standards ozonated water - No Coliforms - ph 5.8~8.6 - No odors - Turbidity lower than a certain value * Quality test is done regularly for confirmation of safety.

Reclaimed Wastewater Use in Aqua/Agriculture(Saga City)

Reclaimed Wastewater Use and BISTRO Sewerage

Saga City operates and controls water quality of reclaimed wastewater by seasons to balance the benefit for water environment and the demand of seaweed cultivation in the Ariake sea.

By using reclaimed wastewater which contains rich nutrients, agricultural products such as paddy rice, spinaches, mandarin oranges and strawberries are well raised in Saga. Fertilizers made from biosolids are also used to enhance local resources circulation, between foods and

sewage systems, as "BISTRO Sewerage".

Paddy rice cultivated by reclaimed water

Strawberry

Soft-shelled turtle raised in treated water

Demonstration Research Project of Innovative Water Reuse Technology in Itoman City, Okinawa Pref. (B-DASH Project) - (FY2015-2016)

<u>**Title :**</u> Advanced Wastewater Reclamation System Using Ultrafiltration Membrane and Ultraviolet Disinfection.

Aim of the Project:

Develop and demonstrate a safe and reliable wastewater reclamation system Enhance local economy such as agriculture in water scarce area

National Institute for Land and Infrastructure Management (NILIM) in B-DASH Project (Breakthrough by Dynamic Approach in Sewage High technology)

ISO/TC282 Water reuse

TC282: Established in 2013, 1st meeting in Tokyo in Jan. 2014 Secretariat (twinned): **Japan** and China, Chair: Israel

"Cool city" by reclaimed water

